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November 5, 1957

CONFIDENTIAL

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Rec'd 11/18 1330

Subject: Contract 112, T.O. II

Dear Sir:

This reports progress during September, 1957, on the development of an Equipment Safeguard Unit which shall meet the following requirements:

1. The unit shall be wholly contained in a weather-tight enclosure of dimensions approximately 6" x 5-3/4" x 4" (dimensions to meet AN rack mounted equipment specifications).

2. The unit shall initiate two strands of Primacord through reliable independent explosive trains.

3. The unit shall be so designed as to prevent accidental initiation by requiring two-handed operation.

4. The unit shall provide a reliable time delay of at least 30 seconds between actuation and initiation.

5. The unit shall pass environmental tests necessary for qualification under Military Specification MIL-E-5272A, titled "Environmental Testing, Aeronautical and Associated Equipment, General Specifications for."

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6. The unit shall be so designed as to permit surveillance and replacement of explosive and pyrotechnic components periodically.

7. The unit shall be detonator safe; that is, initiation of the detonators in the safe position shall not initiate the succeeding elements in the explosive train, nor shall such initiation throw fragments or particles from the weather-tight enclosure.

PROGRESS

During the period covered by this report, five Equipment Safeguard Units, Drawing E12502, were fabricated and expended in static safety and initiation tests. Also, during this period propagation tests using the various primacord fittings were successfully conducted.

The five equipment safeguard units were each fully loaded (i.e., the rotor had four delay columns containing primer, delay, and exit charge, and the housing had two PETN loaded boosters). Three units were tested for static safety in the unarmed position. One unit was tested for static safety in the 45° or 1/2 armed position. The remaining unit was tested for functioning by manual arming.

The units tested for static safety were so placed in a fixture that two delay columns at a time could be fired by dropping a suitable weight upon two firing pins located in drilled holes in the housing in such manner that they contacted the primers initiating the delay columns. The results of these tests were as follows:

Test No. 1 - Unit No. 3

All delay columns fired, gaskets blown out, one firing pin cover plate bulged, boosters unfired, unit static safe - test successful.

Test No. 2 - Unit No. 1

All delay columns fired, gaskets blown out, firing pin cover plate bulged, lower booster

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fired low order by gases traveling around groove in rotor, booster retainer blown out, 3 housing plate screws sheared.

Test No. 3 - Unit No. 2

All delay columns fired, although one column fired several seconds behind others. Damage same as in Test No. 1. Test inconclusive.

Test No. 4 - Unit No. 4

One delay column did not fire due to retainer not being tight and cushioning firing pin. Boosters did not fire, gasket blown out. Test inconclusive.

Test No. 5 - Unit No. 5

Delay columns did not initiate due to firing pins being retarded and not striking primers.

Test No. 6 - Unit No. 5

Delay columns did not initiate, one primer fired. Examination showed primers had not been hit by firing pins. Primer which fired was not hit hard enough by firing pin to initiate properly. Test unsuccessful.

As a result of the above tests, the project officer directed that five more units be fabricated for static and initiation tests. The units are to be so modified as to prevent gas travel to lead holes and firing pin springs strengthened to insure functioning.

Various propagation tests of primacord fittings were conducted as follows:

Test 1 - "A 6" length of primacord was buttered against the center of a 12" length with a T connector." (See Figure 1 Drawing A12539.) Test was successful.

Test 2 - Same as No. 1

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Test 3 - "Two 6" long pieces of primacord were connected by a long union." (See Figure 2, Drawing A12539.) Test was successful.

Test 4 - Same as No. 3.

[redacted]

Test 6 - Same as No. 5

In each of the above tests initiation was accomplished by means of an electric detonator.

FUTURE WORK

The fabrication of 6 Equipment Safeguard Units has been started. These will be completed and tested statically as per instructions of the Project Officer. Dependent upon the success of these tests, fabrication of the 40 units for delivery will be started.

STATUS OF FUNDS

Original Funds Allocated	$ 13,930.00
Additional Funds Allocated	19,755.62
Total Funds Allocated	$ 33,685.62
Previous Expenditures	16,146.98
Balance at Beginning of Period	$ 17,538.64
Expenditure During Period	7,461.53
Balance at End of Period	$ 10,077.11

Very truly yours

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